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## Notes on American Ferns—XIV.<sup>1</sup>

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*DICRANOPTERIS FLEXUOSA* (SCHRAD.) UNDERW.—The occurrence of this species, the only known representative of the family Gleicheniaceae in the United States, near Delschamps Station in the Mobile Bay region of Alabama, was first reported in 1914,<sup>2</sup> the specimens having been collected the previous year by Mr. L. H. McNeill. As the plant was not subsequently reported from other parts of the near-by territory, in spite of painstaking search, this single station was visited repeatedly by local botanists, in particular by Mr. H. P. Löding and Mr. T. S. van Aller, of Mobile, who were interested in seeing that the fern at least maintained itself here. Mr. Arthur Howell's visit to the locality, also, has been mentioned in the *JOURNAL*.<sup>3</sup> News of the destruction of this locality, recently received, is confirmed by Mr. Löding and Mr. van Aller. It will be recalled that the fern grew in a small depression in a clay railroad cut. Early in 1918, Mr. van Aller writes, the railroad company removed all the clay bank in that vicinity for filling around a railroad bridge over the "narrows," literally wiping the fern out of existence. At least no trace of it has been found on several later visits, and unless some of the small plants which Mr. van Aller had transplanted

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<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> Amer. Fern Journ. 4: 15-17.

<sup>3</sup> 7: 105, 106. 1917.

to different places near by should thrive and perpetuate themselves, the species will unfortunately have disappeared from our United States flora. It was believed by Mr. McNeill that the fern grew naturally where discovered and this opinion is shared by all who are fortunate enough to have visited the locality.

*ATHYRIUM AMERICANUM* (BUTTERS) MAXON.—By an unfortunate clerical error the locality data for the recent Nevada record<sup>4</sup> of this species were stated wrongly. The record should stand as follows: Head of Caudle Creek, Pole Creek Ranger District, Humboldt Forest, Elko County, Nevada, alt. 2400–2550 meters, Aug. 18, 1917, *W. W. Eggleston 14135*.

*WOODWARDIA CHAMISSOI* BRACK.—For nearly twenty years the American material previously included in *Woodwardia radicans* has very generally and properly been regarded as specifically distinct from that exclusively Old World plant. It has been assumed, however, that the plants ranging from the region of Puget Sound to eastern Guatemala represent but a single species, *W. spinulosa* Mart. & Gal. Recent study shows, nevertheless, that the United States and British Columbia specimens differ consistently from the plant of Mexico and Guatemala; and while the distinguishing characters are variable, and to a certain extent comparative, they seem important enough to justify the recognition of two closely related species in the North American area. The name *Woodwardia spinulosa*, based upon Mexican material,<sup>5</sup> applies to the southern form; the northern species, which is especially common in the coast ranges of California, was well characterized long ago on California specimens as *W. Chamissoi*, by Brackenridge.<sup>6</sup> The main points of distinction are as follows:

<sup>4</sup> Amer. Fern Journ. 8: 121. 1918.

<sup>5</sup> Nouv. Mém. Acad. Sci. Brux. 15<sup>5</sup>: 64. 1842.

<sup>6</sup> In Wilkes, U. S. Explor. Exped. 16: 138. 1854.

*W. Chamissoi*

FronDS stiffly ascending from an oblique or erect rhizome, the stipes short and stout (up to 1.5 cm. in diameter).

Blades oblanceolate to linear-oblong or oblong-ovate, narrowed downward, the distant basal pinnae often only half as long as the middle ones.

Pinnae (the basal ones excepted) close, often imbricate, rigidly ascending, numerous.

Under side of segments nearly naked, except at an early stage; veins bearing numerous large, pale yellow, transparent resin glands.

Veins arising from fertile costal areoles oblique, once or twice forked, the branches mostly free (at least in upper half of segments).

Indusia nearly homogeneous (the outer part not abruptly membranous, at least), glabrous, often resinous-glandular at the base.

*NOTHOLAENA DEALBATA* (Pursh) Kunze.—This species, described by Pursh<sup>7</sup> as *Cheilanthes dealbata* upon specimens from the "banks of the Missouri," was transferred to *Notholaena* by Kunze in 1848,<sup>8</sup> who properly regarded his own *Notholaena pulchella*, founded on Missouri material a few years earlier,<sup>9</sup> as the same, and commented upon *N. dealbata* as "nearly related to *N. nivea*, though essentially distinct." Subsequently, true *N. dealbata* was found to extend from Missouri and Nebraska southward to central Texas; but there were

*W. spinulosa*

FronDS laxly ascending from a short-creeping or decumbent rhizome, the stipes long and relatively slender.

Blades broadly ovate, not narrowed downward, the basal pinnae large, nearly or quite as long as the middle ones, never distant and reduced.

Pinnae adjacent or all slightly apart, spreading or laxly ascending, few.

Under side of segments brownish-fibrillose along the veins, the minute scales filiform or filamentous, persistent; large resin glands wanting.

Veins from costal areoles less oblique, a majority of them joined basally to form one or sometimes two incomplete additional rows of areoles.

Indusia abruptly membranous in the outer part, never resinous-glandular, a few minute capitate hairs often borne upon the margin.

<sup>7</sup> Fl. Amer. Sept. 2: 671. 1814.

<sup>8</sup> Amer. Journ. Sci. II. 6: 82. 1848.

<sup>9</sup> Bot. Zeit. 1: 633. 1843.

also referred to this species certain specimens from New Mexico and Arizona which are not the same. A part of these were eventually recognized as being different; but on the basis of some of the others, which were regarded as connecting links with the typical form, *N. dealbata* was reduced to varietal rank under *N. nivea*, in 1883, by Davenport,<sup>10</sup> who quoted Baker to the effect that "*dealbata* seems to me now to run gradually into *nivea*." Underwood restored *N. dealbata* to specific rank in 1900,<sup>11</sup> but nominally only and without drawing any clear distinctions, as may be inferred also from his recognizing both *N. nivea* and *N. dealbata* as occurring in New Mexico and Arizona. The facts are, however, that *N. dealbata* is a fairly well-marked species confined apparently to Nebraska, Kansas, Missouri, Arkansas, Oklahoma, and that part of Texas lying from the central portion of the State northward; and that the plant of New Mexico, Arizona, and southern Utah, which has been rather vaguely understood as *N. nivea*, is specifically distinct alike from *N. dealbata* and true tropical American *N. nivea*. The distinctive characters of *N. dealbata* are mentioned hereafter in comparison with the Mexican Border plant, which may appropriately be known as:

**Notholaena limitanea** Maxon, sp. nov.—Rhizome decumbent or horizontal, woody, relatively large, 1–4 cm. long, 1–1.5 cm. thick, conspicuously chaffy at the apex; scales loosely tufted, light castaneous, linear-attenuate, 7–10 mm. long, about 0.5 mm. wide, lightly flexuous, subentire, with a few stalked, turgid, marginal glands. Fronds numerous, cespitose, erect or ascending, 8–25 cm. long; stipes 4–12 cm. long, very dark castaneous or atropurpureous, usually rather slender, naked above the curved base, glaucous; blades deltoid-

<sup>10</sup> Cat. Davenp. Herb. Suppl. 44.

<sup>11</sup> Nat. Ferns, ed. 6, 88.

ovate, subpentagonal, acute, 5–15 cm. long, 4–11 cm. broad, 4–5-pinnate, the rachises blackish, delicate, the minor ones almost capillary; pinnae about 6 pairs, slightly ascending, subopposite, long-stalked, deltoid, contiguous; basal pinnae much the largest, about half as long as the blade, conspicuously long-stalked, subternate, with the basal pinnules long-stalked, subternate, deltoid, the other pinnules smaller, less decomposed, and with shorter stalks; ultimate segments sessile or nearly so, mostly 2–3 mm. long, linear-oblong, appearing slightly broadest at the obliquely truncate or subcordate, inequilateral base, or at maturity often broadly oblong or bluntly ovate-oblong by the thrusting back of the widely revolute margin, the segments thus often plane; under surfaces thickly but flocculently whitish-ceraceous; sporangia numerous, extending at least half the length of the veinlets from their tip, only partially concealed at any stage. Leaf tissue spongiose-herbaceous, glaucous above.

Type in the U. S. National Herbarium, No. 736532, collected on Tortugas Mountain, southeast of Las Cruces, Dona Ana County, New Mexico, altitude about 1,400 meters, Sept. 14, 1902, by E. O. Wooton. Tortugas Mountain, sometimes called also Little Mountain, is an isolated limestone mass rising rather abruptly from the mesa which lies west of the Organ Mountains toward the Rio Grande. The following additional specimens are in the National Herbarium:

NEW MEXICO: Tortugas Mountain, Oct. 14, 1893, *Wooton*; July, 1906, *Wooton & Standley*; Aug. 12, 1906, *Wooton & Standley*. Mogollon Mountains, alt. 2,400 meters, *Metcalf* 1003.

ARIZONA: Hand's Trail, Chiricahua Mountains, alt. 2,100 meters, *Blumer* 1526. Dragoon Mountains, *G. R. Vasey* 6. Nogales, *W. Palmer* 1206; *Evermann*. Near Portal, Cochise County, in the Chiricahua National

Forest, alt. 1,600–1,800 meters, *Eggleston* 10983. Huachuca Mountains, August to October, 1882, *Lemmon*; *Holzner* (Internat. Bound. Comm. 1718). Sonoita Valley, *Rothrock* 657. Dutch Charley's Ranch, near Monument 88, Pima County, *Mearns* (Internat. Bound. Comm. 1851). Tombstone mines, Cochise County, Apr. 23, 1880, *Lemmon*.

UTAH: Mesa, between Bear's Ears, Elk Mountains, and the Natural Bridges of White Canyon, alt. 2,000–2,200 meters, *Rydberg & Garrett* 9386.

The specimens just cited agree in essential characters, but vary considerably in size, however, from *Holzner's* large Huachuca specimen to plants which, though by no means depauperate, are but half that size. In all these the broadly deltoid-ovate form of the blades is a constant and conspicuous character, the basal pinnae averaging at least half as long as the blade itself. Differing from them in minor particulars is the following form, which seems to merit recognition:

***Notholaena limitanea mexicana*** Maxon, subsp. nov.—Blades narrower than in the typical form, oblong to oblong-lanceolate, 3-4-pinnate; pinnae more oblique, narrower, the basal ones only one-fourth to one-third as long as the blade; segments averaging larger.

Type in the U. S. National Herbarium, No. 42059, collected from limestone ledges of the Santa Eulalia Mountains, Chihuahua, Mexico, Sept. 15, 1885, by C. G. Pringle (No. 451). Agreeing with this are two sheets collected by Wilkinson at the same time and place, and a single Arizona specimen (Wilgus Ranch, Chiricahua Mountains, alt. 1,800 meters, Aug. 31, 1907, *Blumer* 2390). The appearance of these specimens is rather distinctive, but the characters are only comparative and the transition to typical *N. limitanea*, though not complete, is definitely indicated. Plants collected in the Burro Mountains of New Mexico by

Rusby in October, 1880, are also to be referred here.

*Notholaena limitanea* and *N. limitanea mexicana* are in all respects more robust than *N. dealbata*. That species differs particularly in its lesser size, its smaller rhizomes and smaller, often obtusely denticulate scales, its more slender (often capillary), paler stipes, its fewer pinnae, its narrow and much thinner segments (these for the most part with a narrowly cuneate base), its much more oblique veins (often apparent above), and in its very much fewer sporangia, these borne usually in a single row apart from the margin, commonly only one to an individual vein-branch.

The relationship of *N. limitanea* and its subspecies with the variable complex of Mexican and South American plants called *N. nivea* is about equally close. That collective species is distinguished in general, however, by its much greater size, its 2-3-pinnate blades, and its much larger, distinctly stalked, mostly cordate segments, as well as by characters of sori and rhizome scales.

WASHINGTON, D. C.

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### **Aspidium cristatum $\times$ marginale and A. simulatum**

RAYNAL DODGE

[The following extracts from a letter written to Mr. C. H. Knowlton by Mr. Dodge in 1907 give a more detailed account of his discovery of the Massachusetts fern and the hybrid between the crested and marginal ferns than has yet appeared and should be of interest to our readers.]

Since boyhood I have been interested in nature study and in making collections of natural objects. My first interest was in birds, bird-egging and gunning, then in